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the gas nozzle means deliver the gas into the internal passage in the direction of liquid flow as the gas mixes with the liquid.

Remarks

Claims 1-36 remain in the case for consideration.

Claim 13 was rejected under 35 USC 102(b) as being anticipated by the admitted prior art of the instant disclosure. Claim 13 has been amended to clearly distinguish it from the "admitted prior art". The preamble of claim 1 refers to introducing a gas jet into a metal passage to induce metal flow from the inlet to the outlet opening of the metal passage. This describes the Areaux disclosure in which he refers to introducing a gas at "supersonic velocities" to produce "bubbles", (Areaux 5,395,094, col. 19, lines 55-65). He relies only on bubbles. and recommends against this type of feed.

Claim 13 has been amended to now more clearly define the invention as a gas jet having a momentum that urges the molten metal from the metal inlet opening toward the metal outlet opening. The gas is introduced in the direction the metal flows past the injection opening. This clearly distinguishes from the preamble of claim 1, which merely calls for a gas jet that induces a flow of metal from the inlet opening toward the outlet opening. The direction the gas is introduced is important, and a feature not recognized by Areaux or the cited art, because bubbles rise independently of the direction the gas is introduced into the moving metal.

It is believed that claim 13 is now in condition for allowance.

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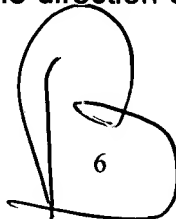
Claims 1-36 were rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art of the instant disclosure as expressed on pages 1 and 2 of the Specification and in the Jepson type preamble of claim 1. The Examiner states that if prior art apparatus performs substantially the same function in substantially the same manner as that claimed, motivation either to shift the location of a component (molten metal entry ports) or the shape of a component (the metal lifting passage) without any showing that such changes materially affect the operation of the apparatus would have been obvious to one of ordinary skill in the art.

Applicant's invention as defined in claims 1-36, in their amended form, define use of the momentum of the gas jet for moving the metal toward the outlet opening. The gas jet is delivered in the same direction as the metal is moving. This limitation is not suggested by the cited art.

Applicant has enclosed the following Declaration of Jorge Morando describing tests conducted to prove that introducing the gas jet in the direction of the moving liquid or metal causes material improvements in the operation of the apparatus.

The tests compare a bubble type of apparatus which, as is well known, moves the metal by raising it up the metal-moving passage. It makes no difference in which direction the gas is introduced into the passage.

The applicant also tested this type of device with what he refers to as a "coaxial-coaxial" device in which a tube is disposed in the center of the metal passage to introduce the gas in the direction of metal flow from a point along the



axis of the metal passage. This showed a definite improvement over the bubble apparatus.

He finally tested what he refers to as a "peripheral" jet pump that performs substantially better than the coaxial-coaxial pump because it does not require an obstruction in the metal passage to deliver the gas. Note in both the case of the coaxial gas and the peripheral gas delivery, the gas is introduced into the conduit in the same direction as the metal is flowing so that the momentum of the gas jet pushes the metal toward the metal moving conduit outlet. This structure is not suggested by any of the cited or admitted art.

All the claims define the invention in terms of the gas-injection openings discharging the gas into the metal lifting passage in the direction of metal flow.

Claims 13-20 focus on the structure in which the momentum of the gas jet pushes the metal toward the outlet opening. This can only occur if the gas jet is introduced into the metal moving passage in the same direction as the metal flows.

Amended claim 21-27 focus on a pump in which the gas momentum is introduced into the metal in the same direction as the gas, and further includes the internally tapered passage which provides special advantages as previously discussed.


Amended claims 28-36 focus on apparatus in which the gas jet momentum pushes the gas along the metal passage, a feature not suggested by any appropriate application of the cited art.

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Serial No.: 09/005,497

The Applicant has a videotape that he can make available to the Examiner if necessary to more dramatically demonstrate the change in function when the momentum of a gas jet is used as defined in the claims.

Accordingly, it is believed that the application is now in condition for allowance and such action is requested.

Respectfully submitted,



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CERTIFICATE UNDER 37 CFR 1.8 (a)

I hereby certify that the foregoing Response is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Box Non-Fee Amendments (PATs), Commissioner of Patents and Trademarks, Washington, D.C. 20231 on September 1, 1999.

